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ABSTRACT

This study evaluated the development of generic skills by students in the Arts Faculty at York University (Ontario, Canada) by comparing entering students and graduating students on a self-report measure. The specific skills evaluated included analytical, communication, personal, organizational, comparative, job procuring, basic numeracy, and computer skills. The study was based on a "value added" approach to measuring the effectiveness of the college experience. A questionnaire was developed and completed by 480 graduating students and 812 entering students in Fall of 1995. Overall, the study found that graduating students scored higher than entering students on all measures of skill and the magnitude of change observed was comparable to that observed in similar studies conducted in the United States. Correlations among high school grades, cumulative grade point averages, and various skills, however, was low suggesting that good high school and university grades do not necessarily indicate high levels of generic skills. (DB)

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VALUE ADDED IN GENERIC SKILLS BETWEEN FIRST AND FINAL YEAR: A PILOT PROJECT

ISR WORKING PAPER

J. PAUL GRAYSON

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VALUE ADDED IN GENERIC SKILLS
BETWEEN FIRST AND FINAL YEAR:
A PILOT PROJECT

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Foreword

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The following is a working paper.

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Summary

While the development of generic skills is viewed by many academics and employers as a desirable outcome of the university experience, the extent to which this objective is realized is seldom measured. In this report differences in analytical, communication, personal, organizational, comparative, job procuring, basic numeracy, and computer skills between students entering, and graduating from, the Faculty of Arts at York University are measured through self-reports in surveys.

Overall it is found that graduating students score higher than entering students on all measures of skill. Moreover, the magnitude of change is comparable to that observed in studies conducted in the United States. Correlations among high school marks, cumulative grade point averages, and various skills, however, are low. These findings suggest that while in Arts graduating students display higher generic skill levels than those entering the university, good high school and university marks do not necessarily indicate high levels of generic skills. Whether or not absolute skill levels of graduating students are sufficient is beyond the scope of this inquiry.

Introduction

In 1995-96 the Vice President (Academic Affairs) of York University established two important task forces. The first focused on ways in which the first year experience could be changed so that students would be better prepared for the demands of university life. The second centred on the development of performance indicators that were related to York's mission.

Discussions in the first task force readily led to the realization that the specification of learning objectives logically preceded both an evaluation of the current first year experience and the formulation of policies intended to improve that experience. The learning objectives eventually accepted by the task force included the development of several generic skills, such as written and oral communication and critical skills, as well as the acquisition of subject matter expertise. While it was recognized that increases in students' generic skills characteristically occur in disciplinary and inter-disciplinary contexts, it was nonetheless agreed that the development of generic skills was different from the acquisition of subject matter knowledge.

The concerns of the first task force unintentionally dove-tailed with those of the second. Among other indices of performance, it was agreed that increases in students' competencies between first and final years was an important aspect of institutional performance - some would say the most important measure of performance. In other words: does the York experience add value in terms of phenomena such as disciplinary expertise and generic skills?

Abstracting from the deliberations it can be argued that both task forces had in common a concern with the specification of learning objectives, putting into practice policies designed to realize the objectives, and determining whether or not objectives had been met. To focus on the last of these concerns, while assessing increases in subject matter competence is not easy, measuring generic skills development is more

difficult still. For one thing, general concepts like analytical and critical skills mean different things to different people. Even if agreement can be reached at the conceptual level, the development of measures that operationalize the concepts is an additional hurdle. For another, while the disciplinary apparatus of the university is designed to evaluate students' performance in subject matter areas, it is not set up to deal with assessments of generic skills. As a result, alternate means must be developed to measure improvements in these areas. Consistent with this objective, the current report will focus on a relatively cost effective attempt, through surveys, to measure generic skills of students entering, and graduating from, the Faculty of Arts, and to assess the value added to generic skills by the university experience.

Although the Vice President (Academic Affairs) and the Dean of Arts supported the research on which the report is based, responsibility for the study's design, analysis, and conclusions rests with the author.

The Need for Generic Skills

In recent years increasing attention has focused on the extent to which students in universities develop generic skills, such as communication skills, critical skills, and personal skills. Usually, however, universities neither attempt to systematically develop such skills nor do they try to measure the degree to which the university experience contributes to development in generic skills. Part of the explanation for this state of affairs may be that there is no consensus regarding the skills universities should develop and that operationalization and measurement of generic skills is difficult and costly.

As evident in the pages of business publications such as Canadian Business and Fortune, in both Canada and the United States, business is putting increased emphasis on the need for the development of generic skills. For example, as well as subject matter expertise, the Conference Board of Canada argues that employers

want employees who can communicate effectively, think critically, have a commitment to continuous learning, demonstrate positive attitudes and behaviours, are responsible and adaptable, and can work well with others (Conference Board of Canada, 1992).

While many may feel that university curricula should not be driven by the needs of business, many of the skills that business has identified as important, such as effective communication and critical thinking, are completely consistent with the objectives of a liberal education. Unfortunately, in many, if not most, universities, when generic skills are even discussed, it is assumed that they will develop as a natural by-product of studies in various disciplines. Moreover, few, if any, institutions identify the acquisition or honing of generic skills as desired outcomes of the university experience.

The Value Added Approach

When examining the extent to which students' experiences in any given university contribute to the development of generic skills or any other desired outcome, it is important to obtain measures of the outcome under consideration at entry and again at graduation so that the 'value added' can be assessed. In essence, measures should be taken of the generic skills of students upon entry to the university and for the same students again upon graduation (Astin, 1991). For both entering and graduating students a utilization of skills in tasks that can be observed or in tests that can be evaluated is desirable (see Pascarella, Nora, and Bohr, n.d., for a discussion of the National Study of Student Learning in the United States that involves this type of assessment). Similar measures should be taken of a same-age control group that does not attend university. Increases in skills between entering and graduating students that are not also observed in the control group can be attributed to the university experience.

Design Problems

In carrying out research of this nature, there are a number of practical matters that intercede between the ideal design and actual research. Primarily, longitudinal research that would measure students' and a control group's skills at appropriate intervals is very costly. Because many students might leave the university or refuse to participate in both the entry and exit measurement of skills, large samples would be required to ensure that at graduation sufficient numbers were still involved in the study to facilitate meaningful analysis. Even if a large sample remained at graduation the possibility exists that non-participants would be different from students who remained in the study. Control group attrition would also be a problem.

A less costly cross-sectional design involves assessing the skills of one group of students at entry and another at graduation after controlling for variables having the potential to influence skills acquisition, such as previous levels of achievement (high school marks), gender, language spoken in the home, and racial origin. If comparisons were to show that graduating students had skills not evident among entering students and a same-age control group differences between the entering and graduating students could be attributed to the university experience. Variations of this method have been used successfully in other studies (Keeley, Browne and Kreutzer, 1982; Steele, 1986).

One problem with this approach is that when they entered university, the graduating students may have been different from the entering group with whom they are being compared. For example, if in recent years an increased emphasis had been placed on generic skills in high schools, entering students would demonstrate higher levels of generic skills than would have been displayed by graduating students when they

were in first year.¹

Although both longitudinal and cross-sectional studies require an external control group if the possible effects of the university experience are to be disentangled from those of maturation, control groups are frequently absent from studies of university outcomes. While this presents difficulties if the intent is to assess the effect of the university experience per se, provided same-age groups are under consideration, it is less problematic if the research objective is one of assessing the impact of different institutional contexts on outcomes. For example, if the outcomes of one university, faculty, or department are being compared with those of other universities, faculties, or departments, provided that same-age groups are involved in the study and that pre-entry characteristics are held constant, an external control group is not required.

Self-Reports

Independent of whether the research is longitudinal or cross-sectional, measuring skills through standardized tests can be an expensive proposition. For example, leaving aside the costs of fees for using standardized tests, instrument scoring, test administrators, and communications with students, participants in the study of outcomes currently being undertaken by the National Centre on Postsecondary Teaching, Learning, and Assessment in the United States are being paid \$30.00 (U.S) for taking the first round of tests and the stipend increases by \$5.00 each time additional tests are taken. A less costly way of measuring skills involves self-reports in surveys.

While self-reports may be viewed as less desirable than more 'objective' measures of, in this instance, skills, as Pike (1995a:1) points out, in the United States the

¹Despite the desirability of longitudinal research in studies of this nature, Pascarella and Terenzini (1991:124) point out that in studies carried out on reflective judgement, longitudinal and cross-sectional research produce similar results.

National Education Goals Panel Resources Group on Adult Literacy and Lifelong Learning noted that the development of assessment tools of use at the national level to measure university outcomes would cost several million dollars and take many years to complete. In the interim the Group recommended that self-reports be used as proxies.

To what extent can self-reports be viewed as reasonable proxies of skills, and/or attitudes and/or knowledge? After examining a number of studies in which the results of self-reports were compared to test results, Pascarella and Terenzini (1991:100) conclude that correlations between self-reports and other measures of the same phenomena range from .25 to .65. More importantly, the literature they draw upon in their examination indicates that the validity of self-reports varies with the specific skills, and/or attitudes and/or knowledge under discussion. For example, Berdie (1971) found a high correlation between self-professed knowledge of public figures and the results of tests designed to measure knowledge of the same figures; however, the relationships between self-reported and tested knowledge of authors and artists were not as high. Similarly, Pohlmann and Beggs (1974) discovered that self-reports of academic growth in the affective realm were supported by test results. Growth in simple and complex cognitive realms, however, did not correlate highly with self-reports. In a review of the literature on the utility of self-reports Baird (1976) cites examples of both high and low relationships with external measures of various phenomena. Still others have presented information suggesting that while self-reports have some uses, they should not be viewed as substitutes for other measures of various college or university outcomes (McMorris and Ambrosino, 1973; Dumont and Troelstrup, 1980).

In view of the objective of the current undertaking, perhaps the most important research to have been undertaken on the relationship between self-reports and other measures of knowledge is reported by Pike (1995a). In brief, Pike studied 1,568

graduating students from 10 colleges and universities in the United States who completed the College Basic Academic Subjects Examination (College BASE) adapted for graduating students. The College BASE tests proficiency in English, mathematics, science, and social science. Students who completed the examination also participated in a survey in which they rated their ability on exactly the same matters covered in the examination. The correlations between test performance and self-reports were sufficiently high for Pike to conclude that self-reports can be used as *general* proxies for traditional measures of academic achievement. He emphasizes, however, that *there must be a high content correspondence between self-report questions and those asked in tests*. While this may seem self evident, other research has focused on the relationship between some *general* self-report measures and the results of *specific* tests.

Although this and other work by Pike (1994, 1995b) is encouraging, it should be stressed that the focus of the research has been on knowledge (not generic skills) as measured through the College BASE. Although the current research assumes a similar relationship between self-reported skills and the results of tests designed to measure such skills, research is necessary to confirm the connection.

The Important Skills

Because there is no consensus in Canada or the United States regarding the generic skills that are both important for university graduates to possess and that should be developed throughout a student's university career, in this study, a list of desirable skills was developed through an *inductive* process. In an iterative process, faculty members with knowledge of skills development, along with researchers from the Institute for Social Research at York University, identified a number of tasks, the performance of which ideally would be improved over the course of a university

Table 1: Skill Categories and Question Topics

- Analytical Skills
 - identifying the main points in lectures in your major
 - clearly identifying the pros and cons of controversial issues like abortion
 - figuring out the main arguments in articles written on topics in your discipline
 - identifying flaws in positions given by other students in classes or seminars
 - explaining your strengths and weaknesses to a potential employer
 - defending a position you have taken in a classroom or seminar against the criticisms of other students
- Communication Skills
 - taking an article you read for a course this year and summarizing it in no more than two pages
 - verbally presenting your ideas on a topic of your choice to a group of ten strangers
 - verbally communicating to other students in your classes the flaws in their positions or arguments
 - writing a letter to a friend
 - writing a letter of application for a job
 - expressing yourself clearly in written English in an essay
 - correcting the grammar and spelling in the essay of a friend
- Personal Skills
 - assessing the feelings of people you have worked with in part-time or summer jobs
 - 'cooling out' a friend who is annoyed with you
 - being able to apologize to someone if you said something wrong about them
 - being able to admit to yourself when you are wrong
 - being able to get along with other people
 - enjoying meeting new people
 - helping friends patch up disagreements
 - considering the feelings of others before doing things
 - knowing yourself
- Organizational Skills
 - planning a job search strategy for a friend
 - organizing priorities to prevent rushing at the last minute
 - recruiting and organizing twenty strangers to collect money for the Heart and Stroke Fund
- Comparative Skills
 - comparing what is going on in Canada to what is going on in a third world country
 - comparing what is going on in Canada today to what was going on fifty years ago
 - comparing what is going on in Canada to what is going on in any European country
- Job Procuring Skills
 - knocked on neighbors doors for odd jobs
 - phoned companies about advertised job
 - sent resumes to companies that might be hiring
 - phoned companies that might be hiring
 - gone to companies to see if jobs are available
 - started own business (painting, catering, etc.)
- Basic Numeracy Skills
 - determining change from a \$10 bill for a \$2.75 pen
 - calculating 15% discount on a \$9.36 book
 - determining percentage Liberal vote when 15 students vote Conservative, 10 NDP, and 20 Liberal
 - solving for 'x' in the equation $3x-5=56.7$
 - explaining the meaning of 'square root'
- Computer Skills
 - using a word processing program
 - using a spread sheet program
 - using a statistical analysis program

career.² (The exception is job procuring skills for which students were simply asked if they had engaged in particular activities.) Next, questions were developed that focused on the difficulty students would have in completing specific tasks. Finally, questions were grouped into logical categories. In keeping with Pike's finding noted earlier, *tasks, and their related questions, were very specific and relevant to students' experiences.*

Survey questions were tested in a small pilot survey involving students about to graduate from Pure and Applied Science, Arts, Fine Arts, and Administrative Studies. For each question, excluding those on job procuring skills for which students were asked how often they completed particular activities, on a five point scale, responses of 1 indicated a high, and 5 a low, level of difficulty in completing the specific task referenced in the question. On the basis of the pilot, some questions were dropped and assessments were made of the reliability of indices comprised of various questions. The relevant skill categories and question topics used in the construction of indices are displayed in Table 1.

While performance on the tasks in each of these skill categories may improve over the student's university career, it cannot automatically be assumed that change is a result of the university experience. Improvements in tasks included in the analytical, communication, and comparative skills categories may result primarily from the challenges of university life (both curricular and non-curricular); however, it is likely that maturation has a role to play in the development of personal skills and perhaps also in organizational skills. Improvements in job procuring activities may reflect economic necessity as much as anything else. Independent of their origins, the important point is that such skills may be essential to a successful post-university career and should be part of the skills repertoire of graduating students.

²Ron Sheese, Nick Elson, Darla Rhyne, Tammy Chi, David Northrup, and Paul Grayson participated in this phase of the study.

The Sample

Information for the analysis of value added in generic skills between first year and graduation was collected in two surveys conducted in the Fall of 1995. The first included all students eligible to graduate in the Fall convocation. In total 480 Arts students returned completed questionnaires as did 25, 30, and 6 students from the Faculties of Fine Arts, Science, and Administrative Studies respectively. Low numbers reflect the facts that compared to Arts other faculties are small and relatively few students graduate in the Fall. Larger surveys of Spring graduates carried out in 1996 will facilitate analyses of faculties other than Arts. The response rate for the survey was 58%.

At the same time as the survey of graduates, questionnaires assessing generic skills were mailed to all students entering the faculties of Fine Arts, Science, and Administrative Studies and to a sample of students entering the Faculty of Arts. The numbers of returns were 171, 223, 100, and 812 respectively. The response rate, approximately 55%, was comparable to the study of graduating students. For both studies, survey data were merged with information obtained from administrative files on marks.

Unfortunately, as with much of the research focusing on value added by the university experience, resources did not permit the establishment of an external control group. Even if resources had not been an issue, given how some of the specific skill constellations under discussion were operationalized, it is doubtful that a comparison with an external control group would have been meaningful. For example, being able to identify the main points in lectures in your major is irrelevant to someone with no post-secondary experience. Comparisons with 'mature' students would have been more germane. Were it to be found that no differences existed between students in their late teens and older students at a similar study level it could be argued that differences in generic skills between entering and graduating

students were not a result of maturation. Such comparisons will be possible after the collection of information from departmental reviews at Atkinson College, the evening operation of York University, that is attended by students older than those in Arts.

Reliability of Indices

The reliability of the various indices of skills as outlined in Table 1 was tested in the surveys of graduating and entering students by using Cronbach's alpha which "can be viewed as the correlation between this test or scale and all other possible tests or scales containing the same number of items, which could be constructed from a hypothetical universe of items that measure the characteristic of interest" (Norusis, 1992:149). In general, indices having alphas at or above .7 can be regarded as reliable.

Cronbach's alpha for each of the skill indices used in this analysis, stratified by survey (entering and graduating), are provided for each faculty in Table 2. For both the entering and graduating samples, with the exception of organizational skills, overall alphas are acceptable for each index. Although overall alphas are acceptable for job procuring and basic numeracy skills in the entering survey, alphas for job procuring skills in Administrative Studies, and basic numeracy skills in both Science and Administrative Studies, are slightly lower than .70. Similarly, in the graduating sample, alpha for basic numeracy skills for students in Science is considerably less than .70. As the current analysis focuses on students in Arts, these deviations are of no current consequence. In essence, in the current analysis, with the exception of organizational skills, all overall alphas, and alphas for each skill within faculties, are acceptable.³

³A principal components analysis using all of the skills variables was conducted in which the number of factors specified for retention, 7, was equal to the number of indices that had been constructed. With factor loadings lower than .4 suppressed, the analysis yielded factors similar to those of basic numeracy, computer skills, personal skills,

Table 2: Cronbach's Alpha for Skills Indexes

	Entering					Graduating				
	Arts	Fine Arts	Science	Admin Studies	Overall	Arts	Fine Arts	Science	Admin Studies*	Overall
Analytical	0.81	0.83	0.84	0.84	0.83	0.83	0.85	0.85	—	0.84
Communication	0.77	0.77	0.80	0.74	0.78	0.77	0.75	0.90	—	0.79
Personal	0.79	0.77	0.83	0.76	0.79	0.81	0.89	0.71	—	0.82
Organizational	0.55	0.45	0.61	0.52	0.55	0.65	0.65	0.68	—	0.65
Comparative	0.81	0.88	0.82	0.87	0.83	0.85	0.79	0.87	—	0.85
Job Procuring	0.78	0.76	0.78	0.69	0.78	0.77	0.77	0.79	—	0.77
Basic Numeracy	0.79	0.78	0.67	0.66	0.79	0.79	0.89	0.47	—	0.80
Computer	0.75	0.81	0.75	0.76	0.78	0.79	0.79	0.77	—	0.79

*Data not included because of small numbers in graduating survey.

Correlations Among Skills and Grades

Correlations among each of the skills and Ontario Academic Credit (OAC) marks are detailed in Table 3 (maximum cases 804, minimum 729) and Table 4 (maximum cases 477, minimum 328). The first thing of note is that for students entering Arts correlations between OAC marks and various skills are low. Of those that are statistically significant, there is a positive correlation between communication skills and OACs (.10); however, for personal and job procuring skills the correlations are negative (-.11 and -.10 respectively).

There are two ways in which this general finding can be interpreted. First, if one expects that generic skills are a necessary condition for high school achievement as measured in OAC marks, the low correlations can be taken as an indication that the current measures of generic skills are invalid: students with high OAC marks *must* possess high generic skills. On the other hand, if it can be accepted that OAC marks do not necessarily reflect generic skills the findings make sense. Certainly many faculty who bemoan the lack of preparation on the part of first year students despite high OAC marks would be amenable to this interpretation. At the same time, if employers are to be believed, it is equally likely that there is little relationship between high university grades and generic skills (Jones, 1994).

Unfortunately, support for employers' concerns is found in Table 4. For graduating students there are statistically significant, but low, correlations (.14 and .16 respectively) between analytical and communication skills and cumulative grade point average (GPA). The statistically significant correlation between job procuring skills and GPA is negative and small (-.09). No other correlations are statistically significant. In essence, there is at best a weak relationship between some generic

comparative skills, and job procuring skills. The other factors combined, in no systematic fashion, variables that comprised the analytical and communication skill categories (see Spector (1992:54) for a rationale). On the basis of these findings it was deemed appropriate to retain the original indices.

Table 3: Correlations for Students Entering Arts

	OAC	Analytical	Communication	Personal	Organizational	Comparative	Job Procuring	Basic Numeracy	Computer
OAC	1.00	.04	.10*	-.11*	.06	.01	-.10*	-.00	-.03
Analytical		1.00	.72*	.43*	.38*	.48*	.27*	-.02	.24*
Communication			1.00	.45*	.43*	.46*	.28*	-.01	.22*
Personal				1.00	.46*	.24*	.21*	-.00	.12*
Organizational					1.00	.29*	.21*	.03	.21*
Comparative						1.00	.23*	.01	.20*
Job Procuring							1.00	-.04	.13*
Basic Numeracy								1.00	.20*
Computer									1.00

*Significant at .05 level or less.

Table 4: Correlations for Students Graduating from Arts

	OAC	Analytical	Communication	Personal	Organizational	Comparative	Job Procuring	Basic Numeracy	Computer	GPA
OAC	1.00	.01	.07	-.06	-.04	-.11*	-.06	.07	-.02	.55*
Analytical		1.00	.70*	.42*	.44*	.46*	.23*	.14*	.18*	.14*
Communication			1.00	.44*	.49*	.44*	.25*	.23*	.26*	.16*
Personal				1.00	.46*	.27*	.25*	.05	.12*	-.06
Organizational					1.00	.37*	.28*	.10*	.26*	.00
Comparative						1.00	.24*	.16*	.27*	-.03
Job Procuring							1.00	.00	.15*	-.08
Basic Numeracy								1.00	.31*	.02
Computer									1.00	.02
GPA										1.00

*Significant at .05 level or less.

skills and GPA: marks may measure subject knowledge but not generic skills.

Unfortunately, once again, we are left with a quandary. If we assume that university graduates *must* possess the generic skills analysed here, then we must also conclude that the skills measures employed in the study are invalid. If, on the other hand, we accept the views of critics that university curricula do not instill generic skills the findings help validate the skills measures employed in the study.

While the link between generic skills and GPA may be weak, the correlation between cumulative GPA and OAC marks is a statistically significant .55. This relationship is comparable to the findings of studies of graduating students in the United States (Astin, 1993:188) and to the relationship between OAC and first year marks for Arts students at York (Grayson, 1995:103). In essence, OAC marks maintain a reasonably strong relationship with academic achievement over the students' university careers.

Control Variables

In order to determine value added, it is necessary to compare the scores on various skill indices of graduating to entering students. While standardized scores are not necessary to achieve this objective, there were two reasons for calculating them in the current undertaking. (For most practical purposes standardized scores (or z-scores) have a mean of 0 and a standard deviation of 1.) First, in order to compare changes at York to changes reported in the literature, and to make changes understandable to the average reader, it is necessary to specify differences between graduating and entering students in terms of percentile point differences. Second, standardized rather than actual scores will be reported in order to protect the confidentiality of the York data. In essence, while readers will know the amount of change that can be attributed to the university experience, they will not know the absolute value of entering and graduating scores (however, such data are available

Table 5: Skills Scores by Gender, Race, and Language Spoken in the Home

	Analytical	Communication	Personal	Organizational	Comparative	Job Procuring	Basic Numeracy	Computer
Male	.04 (443)	.00* (439)	-.18* (437)	-.14* (445)	.12 (444)	.07 (445)	.15* (444)	.15* (437)
Female	.09 (819)	.13 (825)	.18 (820)	.21 (822)	.05 (829)	.02 (821)	-.19 (815)	-.15 (813)
Black	.34* (76)	.32* (75)	.10* (76)	.16* (75)	.09* (77)	.40* (77)	-.12* (73)	-.14 (76)
S Asian	.02 (91)	.07 (88)	.07 (90)	-.07 (90)	.20 (90)	.17 (89)	-.03 (88)	.02 (91)
Chinese	-.93 (142)	-.79 (141)	-.58 (138)	-.22 (142)	-.43 (143)	-.69 (141)	.22 (138)	-.12 (142)
Other	.04 (142)	.04 (145)	-.06 (144)	-.09 (143)	.02 (144)	.12 (142)	.01 (145)	.02 (143)
European	.24 (782)	.22 (786)	.18 (781)	.16 (787)	.16 (789)	.11 (788)	-.14 (785)	-.03 (771)
Other	-.27* (389)	-.28* (389)	-.14* (382)	-.06* (390)	-.01* (391)	-.22* (388)	.08* (384)	-.06 (385)
English	.23 (869)	.24 (870)	.15 (871)	.15 (872)	.12 (877)	.15 (873)	-.13 (871)	-.03 (860)

*F sig. at .05 level or less.

to the York community). From a value added perspective the former information is more important than the latter: the concern is not with the level of generic skills of graduating students but with how much the university experience has contributed to the development of generic skills.

In the analysis of net gains in various skills, it is important to control for possible confounding variables such as gender, racial origin, and language spoken in the home while the student was growing up. That each may have implications for particular skills is evident from Table 5 that includes standardized skills scores for entering and graduating students combined.

Unfortunately, space constraints prevent a detailed examination of data in Table 5. At a very general level, however, it is obvious that considerable differences in skills are based on gender, racial origin, and home language. For example, males score highest on basic numeracy and computer skills. Females do better than males on personal and organizational skills. There are no statistically significant differences for analytical, comparative, and job procuring skills.

If racial origin is examined, Black students score highest on analytical, communication, and job procuring skills. Students of European origin have the highest scores on personal and comparative skills and they tie with Black students for high scores on organizational skills. The highest scores on basic numeracy skills are reported by students of Chinese origin. Differences in computer skills are not statistically significant.

One cause for alarm is the low rating for students of Chinese origin on analytical, communication, and comparative skills. As the majority of these students did not speak English in their homes, these figures likely illustrate the impact of language on various skills areas. In a relatively language neutral area, like basic numeracy, students of Chinese origin score high.

The importance of language is further illustrated when language spoken in the home is examined. For all skills, with the exception of basic numeracy skills, students who spoke English in the home score higher than those who used other languages. Computer skills was the only area in which differences based on home language were not statistically significant.

Assessing Value Added

The percentile point difference in the skills of graduating as compared to entering Arts students, as determined through analyses of covariance in which OAC marks, gender, race, and language spoken in the home were controlled, is summarized in Graph 1.⁴ Overall, the greatest net gains were for analytical and communication skills (24 percentile point gains for each). Organizational, basic numeracy, personal, and comparative skills increased by 20, 14, 12, and 11 percentile points each. Lowest increases, 9 percentile points in each case, were found for job procuring and computer skills.

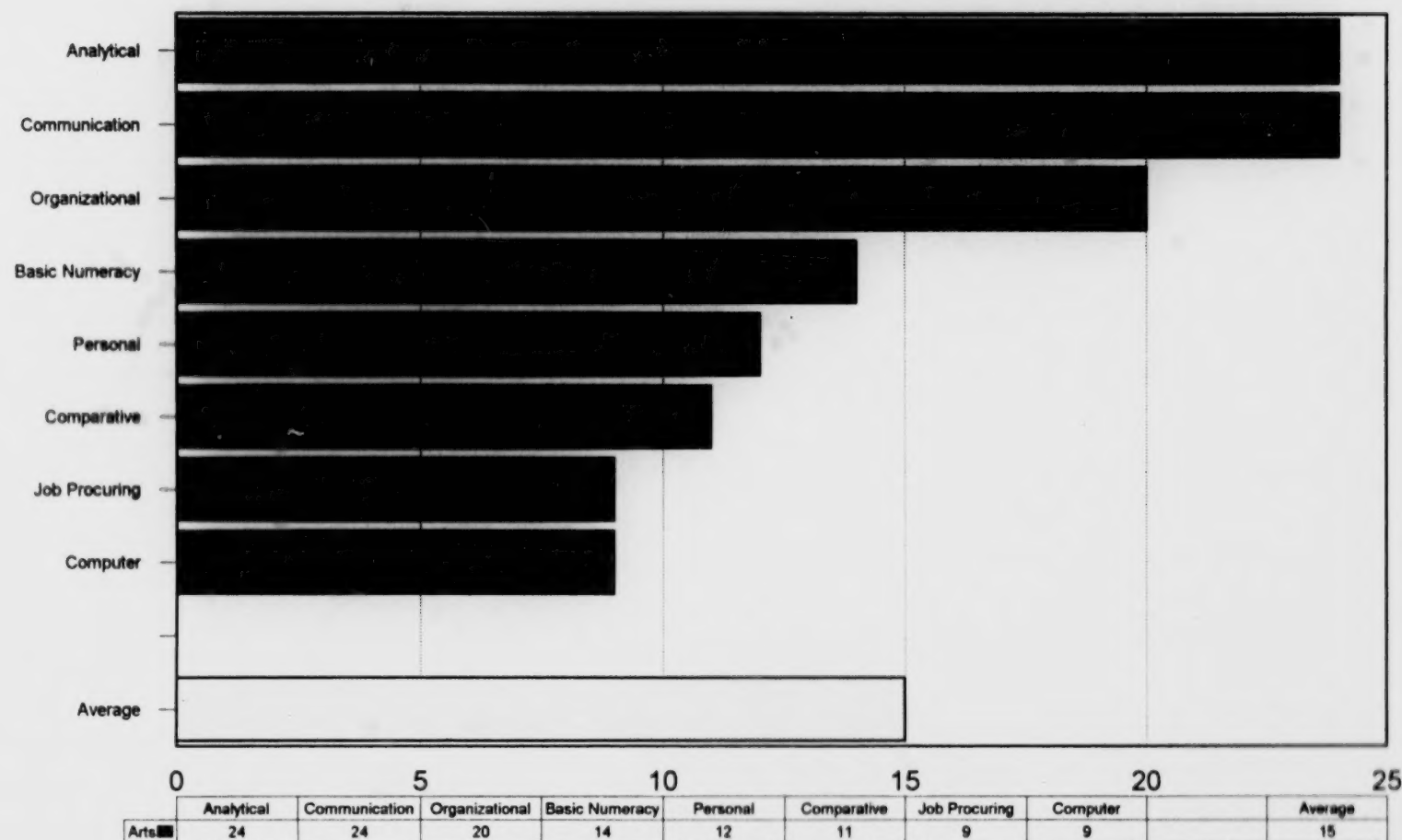
An Overall Assessment

How can we evaluate the differences in generic skill scores of students entering and leaving the Faculty of Arts at York University? Fortunately, in their tome, *How College Affects Students*, Pascarella and Terenzini (1991:558), in Table 6, have summarized findings from a number of studies on freshman to senior gains in a number of domains similar to those analysed here.

The first column of the table lists the skills under consideration. Column two lists the 'effect size' that can be viewed as the difference between the mean score for

⁴Despite differences in Table 5, there was little difference in scores with and without controls. Similarly, scores differed little when the number of entering students were matched to the number of graduating students.

Graph 1: Value Added in Generic Skills Between First and Final Year In Faculty of Arts
in Percentile Points



Note: Controls on OAC Marks, Gender, Race, Home Language

Table 6: Summary of Estimated Freshman-to-Senior Changes: Learning and Cognitive Development

Outcome	Effect Size	Percentile Point Difference
General verbal skills	.56	21
General quantitative skills	.24	10
Specific subject matter knowledge	.84	31
Oral communication skills	.60	22
Written communication skills	.50	19
Piagetian (formal) reasoning	.33	13
Critical thinking	1.00	34
Use of reason and evidence to address ill-structured problems (reflective judgement, informal reasoning)	1.00	34
Ability to deal with conceptual complexity	1.20	38

From Pascarella and Terenzini, 1991:558

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graduating and entering students divided by the entering student standard deviation. (This value is equivalent to the unadjusted mean in the analysis of covariance conducted for this report.) Column three contains information of effect size translated into area under the normal curve.

There are two important observations that can be made on the basis of the data in Table 6. First, overall gains between first and final year are modest ranging from a low of 10 percentile points for quantitative skills to a high of 38 percentile points for ability to deal with conceptual complexity. Second, while different measurement techniques preclude direct comparisons, there is a great deal of similarity between differences observed at York and those seen in studies conducted elsewhere.

For example, Pascarella and Terenzini report gains of 21 percentile points for general verbal skills, 22 points in oral communication skills, and 19 percentile points in written communication skills (the average for these three is 21 percentile points). At York, gains in communication skills, that included some general verbal as well as written and oral components, were 24 percentile points. The same is true of quantitative skills: Pascarella and Terenzini report gains of 10 percentile points and the gain in the Faculty of Arts was 14 points. In the realms of Piagetian reasoning, critical thinking, use of reason, and ability to work with conceptual complexity, Pascarella and Terenzini record average entering to graduating differences of 30 percentile points $((13+34+34+38)/4)$. In Arts the gain for analytical skills, that includes some of the components of the foregoing, was 24 percentile points.

It must be stressed that the studies summarized by Pascarella and Terenzini used many different measures of the skills under consideration (some involved the use of standardized tests of various skills). As a result, it would be wrong to place too much emphasis on *specific* comparisons between their and the York findings. What is important is the fact that gains observed at York are similar in size to those

measured elsewhere; therefore, it can be argued that in terms of generic skills, the value added of an Arts education at York may in general be comparable to the value added in many U.S. universities. More importantly, the use of surveys at York produced gains similar to those elsewhere that used a variety of measurement techniques.

Broader Implications

Students graduating from the Faculty of Arts at York University report higher generic skills than entering students. Scheduled research will determine if similar outcomes can be found in the faculties of Fine Arts, Pure and Applied Science, and Administrative Studies. In addition, on-going program reviews, that will include the questions on generic skills discussed in this report, will facilitate similar examinations at the departmental level. Unfortunately, the degree to which value added in generic skills at York is comparable to that in other Canadian universities is contingent upon the latter opening comparable avenues of inquiry.

In the event that similar research were initiated, what might be expected? Research carried out in the United States can be of assistance in answering this question. As Pascarella and Terenzini (1991:589), after their review of approximately 3,000 U.S. studies related to university outcomes, argue:

There are clear and unmistakable differences among postsecondary institutions in a wide variety of areas, including size and complexity, control, mission, financial and educational resources, the scholarly productivity of faculty, reputation and prestige, and the characteristics of the students enrolled. At the same time, however, American colleges and universities also resemble one another in a number of important respects. It may be that despite their structural and organization differences, their similarities in curricular content, structures, and sequencing; instructional practices; overall educational goals; faculty values; out-of-class experiences; and other areas do in fact *produce essentially similar effects on students although the 'start' and 'end' points may be very different across institutions.*

Given that U.S. universities are far more diverse than those in Canada, it is likely that in this country there is even a smaller difference in outcomes such as those studied here than south of the border. In other words, while institutions like York, Memorial, Queen's, Ryerson Polytechnic University, the University of Toronto, Western, the University of Manitoba, the University of Regina, and the University of Victoria may vary in things like resources and the entering average of students, based on findings from U.S. research, it is unlikely that great differences exist in the value added to generic and other skills.

Discussion

As a minimum, data collected in this study can be viewed as students' perceptions of their standing on measures of generic skills. Although some other studies have found reasonable correlations between self-reports as used here and other skills indicators, a conservative approach requires further validation of the measures used in this study before it will be possible to go beyond the level of perception. This does not imply that students in general are unaware of their strengths and weaknesses: the absolute ratings on many of the skills questions (that were not shown) indicate the contrary.

Although we will not know until comparisons are made between self-assessed skills of traditional and mature students at similar study levels the degree to which differences reported by entering and graduating students are a function of maturation, given the ways in which many skills tasks are operationalized, it is doubtful that similar competencies would have been developed by a same-age control group that did not attend university. Moreover, for some important purposes, the maturation factor is irrelevant. For example, if the concern is with the degree to which students at a particular study level in department x, faculty y, or university z believe that they can identify the pros and cons of controversial issues like abortion, or spot the flaws in arguments of other students, maturation is not an

issue: the students being compared are of a similar age. As a result, in terms of policy, a finding, for example, that sociology students rate their analytical skills lower than those in psychology might lead the sociology faculty to examine their program closely to see if they can introduce changes that would increase the development of analytical skills. As a result, self-reported data on generic skills can assist in the process of departmental and program reviews as well as provide an indication of skills differences between entering and graduating students.

Conclusions

The first conclusion that derives from the foregoing analysis is that at York University students who graduate from the Faculty of Arts leave the university with higher levels of generic skills than students who enter the faculty. Despite this increase in generic skills, cumulative GPAs vary little by skill levels. This finding suggests that generic skills as measured here may not be essential to the achievement of good grades and good grades do not indicate high levels of generic skills.

A second conclusion from the analysis is that the magnitude of the gains in generic skills is comparable to those observed in studies of outcomes of American universities and colleges. Whether *absolute* skill levels, that can be assessed by reference to unstandardized scores on skills indices, are acceptable, is beyond the scope of this inquiry.

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